

**Memorandum****ADMINISTRATIVE RECORD**

To: Mark Raney

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Date: September 28, 2007

Subject: Libby Asbestos Superfund Site OU3
Phase 1 SAP Sample Locations

The location of several sample collection points in the area of the Vermiculite Mountain mine was conducted from September 12, 2007 through September 25, 2007. Preliminary sample locations were generally based on the experimental design described in the draft Phase I Sampling and Analysis Plan (SAP) for Operable Unit 3 (OU3) of the Libby Asbestos Superfund Site (LASS) Section 5.0. The final amount and location of samples were determined following the reconnaissance of the mine area and consideration of the intended purpose of the OU3 sampling program.

This memorandum describes the location of specific points proposed for sampling, including mine waste material, ambient air, road material, surface water and sediment. The location of sample points of coarse and fine tailings, biota, several stream sites on Rainy Creek, and groundwater was not conducted during this event.

Sample target locations include the Vermiculite Mountain mine and portions of Rainy Creek and its tributaries Carney Creek and Fleetwood Creek where they occur in the vicinity of the mine. All sample locations were surveyed with a Trimble GPS unit. Table 1 includes sample survey coordinates, locations, and sample descriptions.

Sample location points are distinguished by the presence of a labeled 3-foot surveyor lathe, painted day-glow orange and wrapped with day-glow flagging. Accessibility to individual sample points is variable. In addition to Rainy Creek road and the main road through the mine, a system of small roads, originally installed in the 1980s for exploration and a groundwater study, surrounds the mine site. The condition of the road system indicates little use and no maintenance since then. Access to sample points on these roads will require a four wheel drive (4WD) truck and/or an all-terrain vehicle (ATV). Small saplings in these roads

could require removal by brush axe or chain saw. Access to several surface water sampling points (seeps) in the wooded area below dumps will also require some walking. Several mine waste samples are located on benches of dump slopes and will also require some walking.

A general summary of sample locations activities is described below.

Ambient Air

A total of eight collection points for ambient air samples (A-1 through A-8) were located around the mine area. Points were located in the mine area (A5 and A-6), the quarry on Rainy Creek Road (A-7) and on remote mining roads that surround the mine (A-2 through A-4 and A-8) and correspond to those points presented in Figure 5-2 of the SAP. Access to air sampling points is marked by lathe (an arrow is marked on these lathe) on Rainy Creek Road and the main mine road. Sample points are accessible by a 4WD truck; however, access to points A-2 and A-3 could require a brush axe or chain saw.

Surface Water and Sediment

A total of 26 points were located for the collection of surface water and sediment samples. Sample locations include sections of Carney Creek, Fleetwood Creek, and Rainy Creek. Sample types for these three areas include the streams, ponds, and springs (seeps).

RAINY CREEK

The Rainy Creek sampling area extends northward from its confluence with Carney Creek to its confluence with Fleetwood Creek. Three points were located in this area, including the tailings pond (TP) and the tailings pond toe (TP-TOE) which is a seep occurring at the base of the dam, and the mill pond (noted as HP on SAP Figure 5-2 and as MP in SAP Section 5.2.1). Access to TP-TOE is from Rainy Creek Road south of the dam and is marked with a lathe.

CARNEY CREEK

The Carney Creek sampling area includes Carney Creek and seeps that were detected at several areas near the toe of the east, middle, and west mine dumps.

Carney Creek contained visible water in the area extending from Rainy Creek to approximately 6500 feet east, where flow proceeded northward in a tributary. Water was not noted in the remaining course of Carney creek or other tributaries. Two sample points (CC-2 and CC-3) were located in Carney Creek. Sample point CC-SPRING 1 (SAP Figure 5-2) was dry. The area of proposed sample point CC-1 (SAP Figure 5-2) was inaccessible.

16 seeps were detected adjacent or near the toes of the three prominent mine dumps located north of Carney Creek. The seeps were detected by the presence of reeds and cattails (several dry seeps were observed in both Carney Creek and Fleetwood Creek that would likely be

active in wetter conditions). Seeps consisted of two types: 1) the emergence of surface water and variable lengths of flow paths before flow submerged beneath vegetation and soil, and 2) isolated pools. The surface occurrence of seeps appeared to be either natural or due to artesian flow from borings that were drilled several years ago. Some seeps (CCS-1, CCS-5, and CCS-8) originated at the toe of dumps, but several others (CCS-6, CCS-7, and CCS-10 through CCS-15) occurred up to several hundred feet from the dumps. Three seeps (CCS-2, CCS-3, and CCS-4) originated from the toe of slope failure scarp. Seep 1 (SAP Figure 5-2) was dry; however, SEEP 2 was determined to be the up-gradient source of Carney Creek. Seep CCS-9 was the most western seep detected along the toe of the west dump.

Stream sample points CC-2 and CC-3 are easily accessible by 4WD truck; however, access to the seeps will require a 4WD truck, an ATV and a brush axe and/or chain saw to decrease walking distance.

FLEETWOOD CREEK

The Fleetwood Creek sampling area includes Fleetwood Creek from its convergence with Rainy Creek and eastward along the toe of the coarse tailings dump and several tributaries.

Fleetwood Creek contained visible water in the area extending from Rainy Creek to a tributary located approximately 4000 feet east. Surface flow in this area was discontinuous and would emerge and disappear depending on localized stream characteristics. Much of the course of Fleetwood Creek in this area is controlled by a road that was constructed at the base of the tailings dump. The road separates Fleetwood Creek from the tailings dump. As flow from the wet tributary converges with Fleetwood Creek, flow proceeds westward on the north side and parallel with the road. Water was not noted in Fleetwood Creek or other tributaries located east of the flowing tributary.

Three sample points were marked in Fleetwood Creek. Sample point FC-1 (SAP Figure 5-2) was dry (noted as FC-1 DRY on the sample location map) and was relocated (FC-1 REV) to an area where water originating from the wet tributary converged with Fleetwood Creek. Point FC-2 (SAP Figure 5-2) was dry and was relocated several hundred feet upstream (east) to where water first emerged. Point FC-UPPER TL POND is located at a small pond at the toe of the tailings dump, and adjacent to Fleetwood Creek.

Seeps were not detected at the toe of the coarse tailings dump in Fleetwood Creek.

Access to Fleetwood Creek sample points will require a 4WD truck or an ATV and a brush axe and/or chain saw to decrease walking distance.

Road Bed Material

Three sample points (MW-1, MW-2, and MW-3) for collection of road construction material were located on an unpaved section of Rainy Creek Road. Sample point MW-1 is located directly north of the vehicle decontamination station, adjacent to the lower pond. Points MW-2 and MW-3 are located north of point MW-1 at approximate intervals of 1200 feet.

Mine Waste and Soils

A total of 29 points were located for the collection of mine waste and soil samples. Sample points were located in all mine areas, including the former mill area, the mine pit, mine high wall areas, roads, benches, and dumps. Sample material for these three areas includes waste rock, road, bench, and dump cover material, and outcrop material.

SAMPLE MATERIALS

The mine site was actively reclaimed in the 1990s following cessation of vermiculite production. Present ground surface material is variable depending on location. Mine dumps occur throughout the interior area of the mine at the periphery, most notable in the Carney Creek drainage. Slopes of interior dumps were graded, but peripheral dump slopes appear to be unchanged since production.

Waste Rock- Dump material is composed of waste rock, which is rock that contains no vermiculite or low concentrations of vermiculite. Waste rock includes biotitite, biotite pyroxenite, magnetite pyroxenite, syenite, Libby Amphibole (LA), glacial till, and other minor dike and fracture-fill material.

Dumps contain highly variable types of waste rock. During mining production, several areas of the mine were simultaneously worked. It was common practice to direct waste material from all areas to a specific dump for an assigned period of time, resulting in the waste rock variation. After a truckload of material was dumped near the edge of the dump, a bulldozer would push the material over the edge. Finer material would adhere to and accrete the slope, while coarser material would roll to the toe. Coarse material has been observed several hundred feet from dump toes. Safety benches were constructed on dump slopes to minimize the occurrence of rolling material using either a bulldozer, or by repositioning the dumping point after a designated dump height was achieved.

Dumps have been reclaimed by grading slopes of interior dumps and flattening and applying a ground cover to the tops of peripheral dumps. Dumps have been covered with finer material, often composed of finer fractions of shot rock or with fine material from other mined areas (see below).

Road, Bench, and Dump Cover Material- Mine roads were constructed to permit heavy equipment and personnel access to dumps and production areas. Where road material

through a specific area of the mine was too coarse for truck traffic, roads were covered with fine material from another section of the mine to minimize tire wear. An inspection of waste rock material and road material indicates that probably all of the material covering the mine roads, the ground cover of reclaimed dumps, the mill area, and high-wall and pit benches originated from the mine area. The fine material was likely provided by the pyroxenites which decomposes rapidly when exposed to the atmosphere. Blasting of this rock type also produced a large amount of fine material. Glacial till was also used as ground cover in several reclaimed areas, most notably on reclaimed benches in the high-wall areas.

Outcrop Material- The mine production area is noted by the presence of high walls and the mine pit. Production ceased in these areas as ore grade diminished. Outcrop material is composed of exposures of biotite, biotite pyroxenite, magnetite pyroxenite, syenite, LA and other minor dike and fracture-fill material.

SAMPLE LOCATIONS

Former Mill- Four sample points (MW-10 through MW-14) are located in the former mill area. Cover material has been applied to all of this area.

Waste Rock Piles- Sample points on the three prominent dumps in the Carney Creek drainage are designated as follows:

West Dump	MW-15, MW-16 MW-26 through MW-29
Middle Dump	MW-14, MW-17, MW-18
East Dump	MW-19, MW-20 MW-30, MW-32

Waste rock pile sample points are located at top edges and on non-reclaimed benches of dumps

Cover Material- Four sample points of various cover material are designated as follows:

High Wall Bench Cover	MW-22, MW-23, MW-33
Dump Cover	MW-24

Outcrop- Eight outcrop sample points are located as follows:

High Wall Area	MW-21, MW-25, MW-31
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MW-35 through MW-38

Pit Area

MW-34

Sample points of outcrop do not include pure LA exposures.

All mine waste and soil sample points are readily accessible with the exception of dump bench locations that will require a 4WD truck or an ATV and a brush axe and/or chain saw to decrease walking distance.

Summary

66 sample points have been located in the area of the Vermiculite Mountain mine in OU3 of the LASS pursuant to guidelines of the draft SAP. Several sample points have been added and deleted from the proposed scope of work. Sample point locations essentially adhere to the locations proposed in the draft SAP except where points were relocated to complement the purpose of the SAP.

Recommendations

The following activities are recommended to expedite proposed sampling efforts and to augment the purpose of the SAP.

16 seep sample points were collected in the Carney Creek drainage. The water source of several of these points is likely related. Reduce the number of seep sample points to the following:

West Dump	CCS-1, CCS-6, CCS-8
Middle Dump	CCS-11, CCS-14
East Dump	SEEP 2

LA material was observed in mole burrows approximately 1000 feet from dump toes in the Carney Creek drainage. A comprehensive soil sampling program is recommended for shallow horizons in soils surrounding the mine site to determine the lateral extent of LA due to erosion.

This reconnaissance of current mine conditions was completed in on an expedited schedule. A more comprehensive survey is recommended to determine the complete location and condition of mine structures, such as reclaimed and nonreclaimed areas, mine pits, high walls, roads, dumps, exposed geology, and surface cover.

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ID	Easting	Northing	Comment	Class	Location
1	616992.197	5368494.506	A-1	Air	Old mine Road
2	617797.426	5366300.990	A-5	Air	Eastof Mill Area
3	618793.495	5365259.692	A-6	Air	High Wall
4	618431.285	5367767.646	A-2	Air	Old mine Road
5	617620.280	5366958.065	A-4	Air	East of Mill Tailings
6	619398.426	5365981.157	A-3	Air	Old Mine Road
7	615172.387	5364343.997	A-7	Air	Quarry
8	616466.390	5365186.504	A-8	Air	Old mine Road
9	617291.910	5365171.538	CCS-1	Seep	Carney Creek- West Dump
10	617347.697	5365128.587	CCS-2	Seep	Carney Creek- West Dump
11	617332.659	5365083.270	CCS-3	Seep	Carney Creek- West Dump
12	617350.048	5365083.898	CCS-4	Seep	Carney Creek- West Dump
13	617250.368	5365089.838	CCS-5	Seep	Carney Creek- West Dump
14	617118.559	5365043.157	CCS-6	Seep	Carney Creek- West Dump
15	616964.356	5365071.700	CCS-7	Seep	Carney Creek- West Dump
16	616952.379	5365088.015	CCS-8	Seep	Carney Creek- West Dump
17	616485.010	5365616.248	CCS-9	Seep	Carney Creek- West Dump
18	616072.952	5365757.011	CC-2	Stream	Carney Creek
19	617891.658	5365310.297	CCS-10	Seep	Carney Creek- Mid/East Dumps
20	617864.507	5365319.940	CCS-11	Seep	Carney Creek- Mid/East Dumps
21	617928.304	5365296.568	CCS-12	Seep	Carney Creek- Mid/East Dumps
22	617991.985	5365262.385	CCS-13	Seep	Carney Creek- Mid/East Dumps
23	618016.059	5365302.378	CCS-14	Seep	Carney Creek- Mid/East Dumps
24	617908.531	5365368.568	CCS-15	Seep	Carney Creek- Mid/East Dumps
25	617697.508	5364517.597	CC Seep 1- CHECK	Seep	Carney Creek- Dry
26	618221.870	5364668.525	SEEP 2	Seep	Carney Creek- East Dump
27	617414.268	5364809.691	CC-3	Stream	Carney Creek
28	618517.936	5367003.731	FC-1 DRY	Stream	Fleetwood Creek- Dry
29	617551.660	5367239.002	FC UPPER TL POND	Pond	Fleetwood Creek
30	617831.645	5367230.200	FC-1 REV	Stream	Fleetwood Creek
31	617056.081	5367301.301	FC-2	Stream	Fleetwood Creek
32	616543.454	5367057.367	TP	Pond	Tailings Pond
33	616417.638	5366531.788	TP-TOE	Stream	Tailings Pond Toe
34	615929.440	5365870.568	HP	Pond	a.k.a. MP: Mill Pond
35	617123.647	5366406.838	MW-10	Mill Area	Mill Area Site
36	617082.168	5366323.031	MW-11	Mill Area	Mill Area Site
37	617046.525	5366216.451	MW-12	Mill Area	Mill Area Site
38	617121.073	5366127.176	MW-13	Mill Area	Mill Area Site
39	617090.963	5365594.966	MW-24	Cover Soil	Dump Cover
40	617889.296	5365805.396	MW-23	Cover Soil	High Wall Bench Cover
41	618449.393	5365488.386	MW-21	Highwall	High Wall Outcrop
42	618296.190	5365931.965	MW-22	Cover Soil	High Wall Bench Cover
43	618617.644	5365127.240	MW-20	Waste Rock	East Dump
44	618177.220	5364916.498	MW-19	Waste Rock	East Dump
45	616938.421	5365396.772	MW-26	Waste Rock	West Dump
46	617074.481	5365359.367	MW-27	Waste Rock	West Dump
47	617201.130	5365337.931	MW-28	Waste Rock	West Dump
48	617332.104	5365374.084	MW-29	Waste Rock	West Dump
49	617203.637	5365215.590	MW-16	Waste Rock	West Dump
50	616888.488	5365249.094	MW-15	Waste Rock	West Dump
51	617647.435	5365089.763	MW-17	Waste Rock	Middle Dump
52	617821.481	5365166.091	MW-14	Waste Rock	Middle Dump
53	617637.317	5365656.130	MW-18	Waste Rock	Middle Dump
54	618311.179	5364855.158	MW-30	Waste Rock	East Dump
55	618313.978	5365912.139	MW-31	Highwall	High Wall Outcrop
56	618563.396	5365010.185	MW-32	Waste Rock	East Dump
57	618448.349	5365494.749	MW-33	Cover Soil	High Wall Bench Cover
58	617709.107	5365509.057	MW-34	Highwall	Pit Area Outcrop
59	617468.178	5365928.190	MW-25	Highwall	High Wall Outcrop
1	615950.482	5365982.975	MW-1	Road	Road Material
2	616104.919	5366338.857	MW-2	Road	Road Material
3	616293.706	5366710.774	MW-3	Road	Road Material
4	617795.664	5366102.513	MW-35	Highwall	High Wall Outcrop
5	618102.723	5366122.492	MW-36	Highwall	High Wall Outcrop
6	618348.552	5366190.750	MW-37	Highwall	High Wall Outcrop
7	618119.981	5365920.803	MW-38	Highwall	High Wall Outcrop

Table 1 - OU3 Phase 1 Sample Locations (UTM Zone 11N NAD83)